

**WATER QUALITY MONITORING QUARTERLY REPORT  
OCTOBER - DECEMBER 1997**

for

**CLARKSBURG TOWN CENTER  
MONTGOMERY COUNTY, MARYLAND**

Prepared For:

Clarksburg Limited Partnership  
C/O First Sumner L.L.C.  
342 Hungerford Drive  
Rockville, Maryland 20850

Submitted To:

Montgomery County  
Department of Environmental Protection  
250 Hungerford Drive  
Rockville, Maryland 20850

Prepared By:

Biohabitats, Inc.  
15 West Aylesbury Road  
Timonium, Maryland 21093

January 8, 1998

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## 1.0 INTRODUCTION

Little Seneca Creek watershed is designated as a Special Protection Area (SPA) by the Montgomery County Council. Development within SPAs requires measures to protect water quality and quantity so pre- and post-construction conditions are near equal. The Clarksburg Town Center is located within the headwaters of an unnamed mainstem tributary, and its two tributaries, which flows into Little Seneca Creek.

In cooperation with the Montgomery County Department of Environmental Protection (MC-DEP), Biohabitats developed and implemented a monitoring program for the Clarksburg Town Center that will monitor water quality and quantity before construction, thus establishing pre-construction baseline conditions. This document is the third quarterly report on the results of the monitoring program.

A detailed description of the project background is included in the first Water Quality Monitoring Quarterly Report for Clarksburg Town Center submitted to MC-DEP on July 23, 1997.

Monitoring protocols are based on those established in the report "Water Quality Inventory, Water Quality Plan Submissions for Clarksburg Town Center, Montgomery County, Maryland" prepared by Biohabitats, Inc. and submitted to Montgomery County Department of Environmental Protection on March 27, 1995. Monitoring equipment, protocols, schedule, and site locations are described in the first quarterly report for the Clarksburg Town Center.

## 2.0 SUMMARY OF RESULTS

### 2.1 Flow, Rainfall, and Temperature

Automated data loggers are used to record stream flow, rainfall, and temperature at 15 minute intervals. Monthly stream flow and rainfall are plotted together for each monitoring station.

#### 2.1.1 *Converting Water Level to Discharge*

The Isco 4120 automated flow logger calculates the water surface elevation by measuring hydrostatic pressure with a pressure transducer installed directly in the stream channel. The relation between water surface elevation and discharge was determined by direct field measurement of discharge and water surface elevation at different flow stages. Manning's Equation was calibrated with field measurements and used to extrapolate the relation beyond the range of measured flows. The relation between water surface elevation and discharge is non-linear due to irregular changes in cross section area with depth, changes in channel roughness, and hysteresis among other reasons. The relation is approximated by a linear function developed using the field measurements in combination with the Manning's Equation as described above. Figure 3.1 graphs the relation at the flow logger location.

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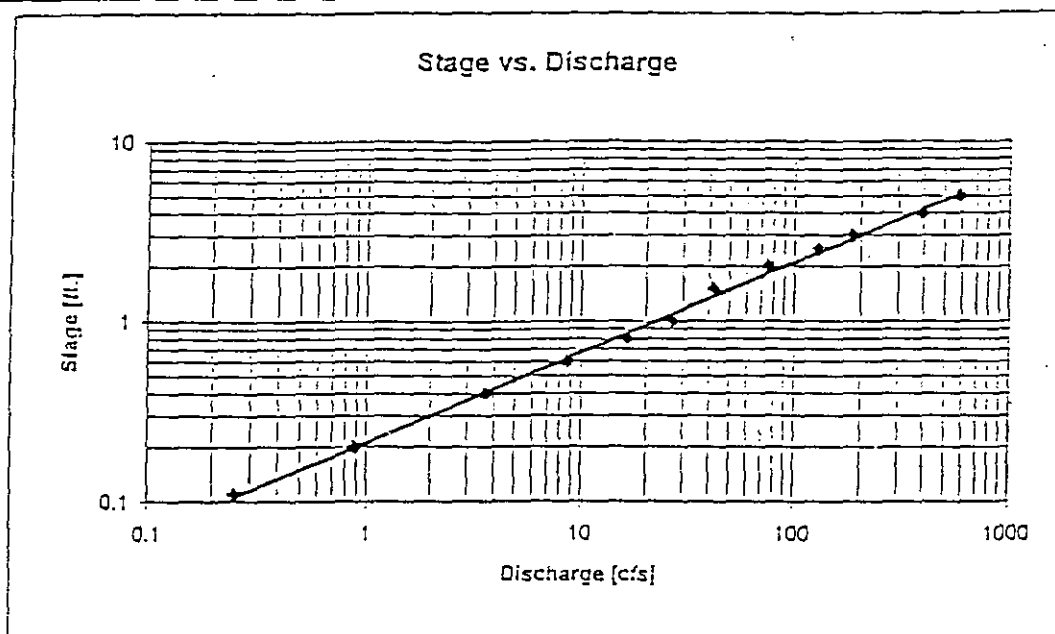


Figure 2.1 Relation between discharge and water surface elevation determined by field measurement at the Stringtown Road flow logger location.

#### 2.1.2 Rainfall Data

One rain gage was installed at the flow logger monitoring station (near Stringtown Road) on March 28, 1997. The rain gage monitors rainfall to the nearest 0.01 inch at 15 minute intervals.

#### 2.1.3 Temperature

Stream temperature was recorded at 15 minute intervals on each of the three tributaries during the spring and summer months only, thus temperature data is not included in this report. Plots of stream temperature and a discussion of the data collected during the above mentioned months were included in the first and second quarterly reports.

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2.1.4 *Tributary Permanent Cross Sections*

Two permanent cross sections were required to be established on each of the two tributaries. As per the protocols, these cross sections were only required to be flow monitored once a quarter. During a site visit on November 26, 1997, both cross sections were monitored. At the time of this visit the west tributary was calculated to have a discharge of 0.05 cfs and the east tributary was calculated to have a discharge of 0.06 cfs.

2.1.5 *Monthly Summary Plots*

Average and peak discharge values are given for each month in Table 2.2. Discharge, water elevation, and daily rainfall are plotted in Figures 2.2 - 2.4.

	October 1997		November 1997		December 1997	
	Mean	Peak	Mean	Peak	Mean	Peak
Logger	0.45 cfs	1.50 cfs	1.89 cfs	36.29 cfs	0.49 cfs	2.82 cfs

Table 2.2      Monthly average and peak flows for October 1997 through December 1997.

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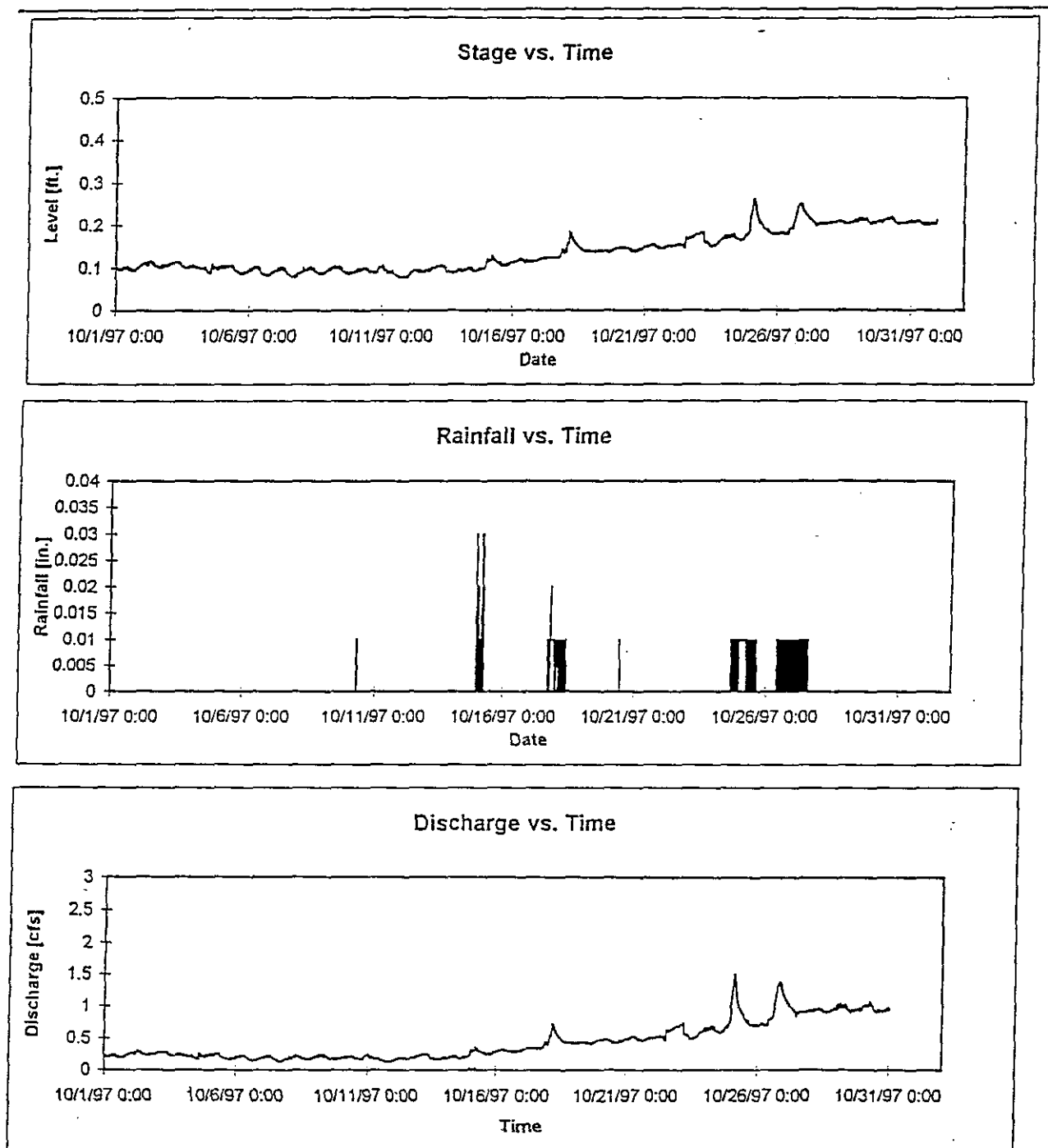


Figure 2.2 Water level, discharge, and daily rainfall at the Stringtown Road logger during October 1997.

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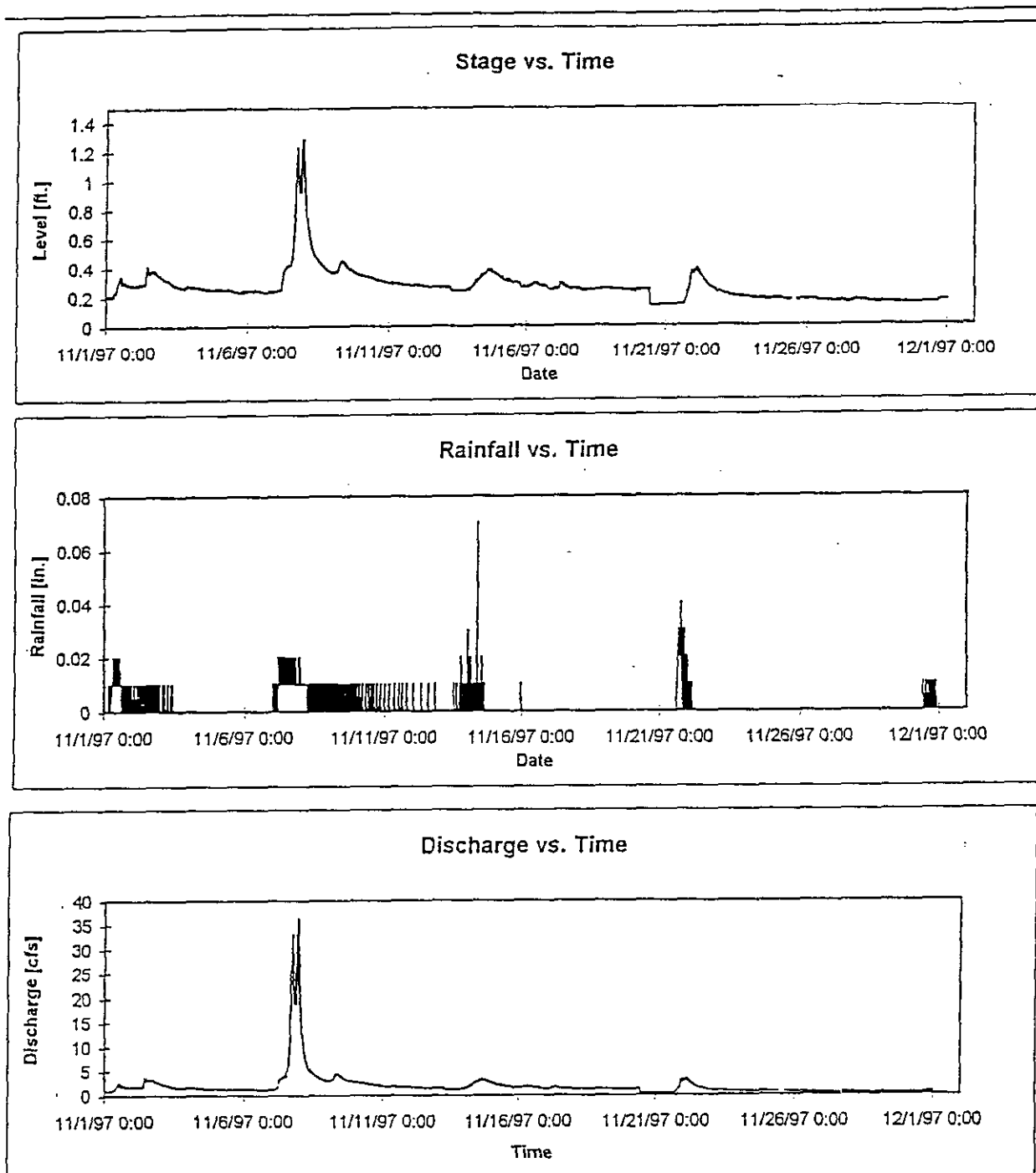


Figure 2.3 Water level, discharge, and daily rainfall at the Stringtown Road logger during November 1997.



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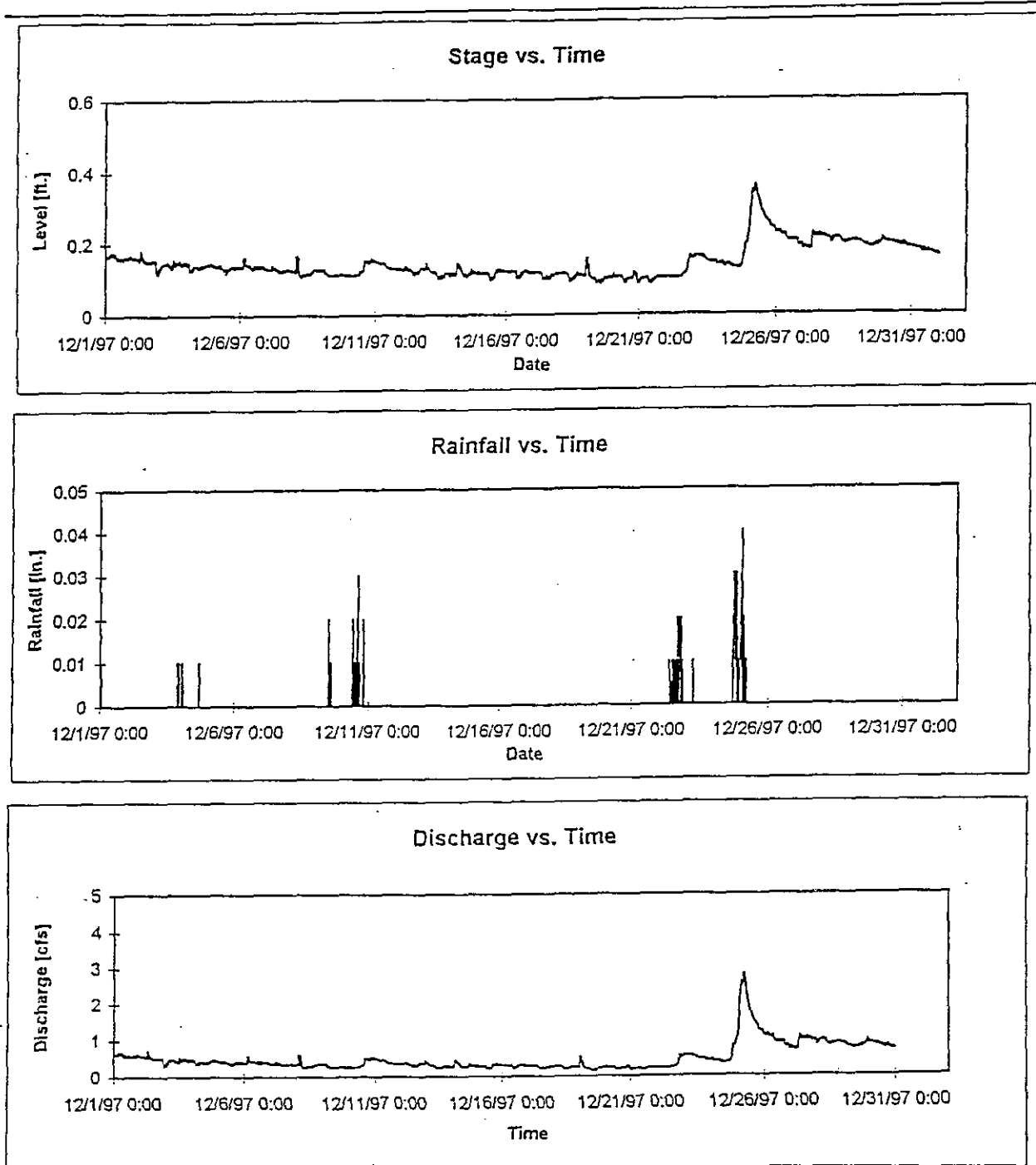


Figure 2.4 Water level, discharge, and daily rainfall at Stringtown Road logger during December 1997.

### 3.0 Concluding Remarks

Water quality monitoring data collected to date represent a 9 month period of pre-construction conditions. This body of monitoring data is part of the year-long effort to effectively characterize the baseline site conditions, and provide a reference condition to be used in the evaluation of potential impacts of the proposed development of Clarksburg Town Center.

Flow data and field observations recorded during this quarter reveal that baseflow has increased on the main stem since the second quarterly report. In addition, baseflow returned to both the east and west tributaries this quarter, both of which were dry during the second quarter. Due to groundwater recharge, as a direct result of the decrease in the potential evapotranspiration and cessation of water uptake by plants during the fall and winter months, the water table has risen in the area, thus, allowing baseflow to increase in the main stem and return in the two tributaries.

During this quarter, the stream continued to show typical behavior of a headwater stream with its short lag time responses to storm events, and, an increase in baseflow due to groundwater recharge during the fall and winter months. In addition, we were able to observe how the stream responds to a storm of considerable size. The storm began on November 7th and continued through November 11th, producing a total of 2.72 inches of rain. This storm reached its highest intensity early in the storm and maintained this high intensity for several hours. The figures exhibit how the stream quickly responded to the high intensity and how the discharge of the stream quickly dropped back down as the storm lost its intensity. Again, this flashy response to storms is typical of headwater streams.

The baseline site conditions will be more thoroughly discussed in the next quarterly report which will conclude the year-long monitoring effort. The final quarterly monitoring report for the first year of monitoring will effectively characterize the stream system based on the data collected throughout the year.



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